Abridgment

Texas Highway Finance: The Highway Cost Index

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ABSTRACT

The major era of highway development in Texas, and in the United States in general, began with the creation of the Federal Highway Trust Fund and the 1956 initiation of the Interstate highway program. By the 1970s, dedicated revenues flowing into state and national highway trust funds were lower than expected, which resulted in the recognition of an impending financial shortfall. Reviewed in this paper is Texas' experience with a new funding approach, the Highway Cost Index (HCI). Discussions are presented on the major activities and events that preceded the adoption of House Bill 3, which established the HCI in 1977; the structure of the HCI; and on two of the major problems encountered during its operation that caused it to fail.

In the early 1970s, the Texas State Department of Highways and Public Transportation (SDHPT) experienced a highway planning and funding dilemma. The cost of highway activities, mainly construction and maintenance, was increasing. Financial resources available to the state were lower than had been originally forecast. Dedicated revenues flowing into the state (and national) highway trust funds were lower than expected and this resulted in a financial shortfall.

In response to this funding dilemma, the State Legislature adopted House Bill 3 (H.B. 3) in 1977, which created a new mechanism for highway funding. This mechanism was established, in part, to provide increased funding without increasing taxes by utilizing a part of the state's large budget surplus. A major aspect of H.B. 3 was the measure of increased oversight and budgetary control that was created by the formation of the Highway Cost Index (HCI) Committee. The HCI Committee, which included the governor, the lieutenant governor, and the comptroller of public accounts, would periodically review and certify index numbers that directly affected the annual program activities of the SDHPT. House Bill 3 increased funding by providing for the inclusion of general funds in the State Highway Fund when dedicated highway revenues failed to meet a specified funding level. The traditional "user pay" policy, in the form of dedicated revenues, was linked with nonuser or general fund revenues to ensure a sustained level of state highway activity.

This paper contains a review of Texas' experience with this new funding approach. The first section provides a discussion of the major activities and events that preceded the adoption of H.B. 3. Following this are reviews of the structure and procedures of the HCI, and of two of the major problems encountered during its operation.

THE FUNDING DILEMMA

In June 1975, the management consulting firm of McKinsey and Company was hired by SDHPT to conduct a comprehensive and objective year-long evaluation of the department's highway program. It had become evident before this time that SDHPT was committed to a large backlog of construction projects. (Construction projects include right-of-way, acquisition, rehabilitation, and reconstruction.) Because of the anticipation of a financial shortfall over a 20-year period, there was growing concern that most of these projects would never be completed.

Anticipated Revenues

Because of steady increases in the number of vehicles and the total miles of travel in Texas, motor vehicle registration fees and motor fuel taxes have been increasing consistently over the years. From 1955 to 1975, revenues from state sources grew at an average rate of 6 to 7 percent per year. However, inflation rates have also been rising. Construction costs in Texas increased 3.2 percent per year from 1955 to 1965, 7.0 percent per year from 1965 to 1971, and 19.0 percent per year from 1971 to 1975.

Just as the inflation rate was increasing, there was a growing concern that the rate of increase in revenues would decrease as many Texas drivers purchased smaller, more fuel-efficient automobiles and were forced to drive at lower, more economical speeds. Decreases in fuel consumption were also expected to decrease the amount of construction reimbursement monies available from FHWA (FHWA). Forecasts by the McKinsey/SDHPT study team indicated that only $1.9 billion in constant 1975 dollars would be available from 1976 to 1995 for reduction of the construction backlog. It was concluded that without new revenue sources, virtually all state revenues would be absorbed by nonconstruction expenditures. By 1985, only $20 million (in 1975 dollars) would be available for use toward the reduction of the construction backlog, and only $28 million (in 1975 dollars) would be received from FHWA. From 1976 to 1995, a total of only $120 million (in 1975 dollars) would be available for reduction of the backlog.

The Construction Backlog

When the McKinsey study began, SDHPT estimated that the value of the 20-year backlog of construction projects was $5.2 billion (in 1975 dollars). The McKinsey/SDHPT study team, however, carefully ex-

amined the cost figures of these projects and reinterpreted the definition of a project backlog. The revised inventory of committed projects included all projects

1. On which a formal action or commitment had been made by SDHPT (e.g., a minute order of the commission, public speeches, the construction of the first stage of a project);
2. That identified the existence of a "gap"--a short section of unimproved roadway on an otherwise improved highway; and
3. For which there was the expectation that a facility would be maintained at a safe level of service, without recurring periods of intense congestion.

The addition of the newly identified projects and the revision of all construction and right-of-way costs resulted in a backlog increase (in 1975 dollars) from $5.2 billion to $10.9 billion. New estimates for rehabilitation costs were later produced, resulting in a 20-year committed backlog of $11.8 billion.

A major objective of the McKinsey study was the examination of the projects in this $11.8 billion backlog. The central question was, "How did the construction backlog get so large?" Aside from inflation, one possibility was that there may have been major limitations in the traditional project-oriented approach to planning. Four major problem areas were identified:

- Authorization of too many projects;
- Requirement of large-scale, rigid responses;
- Preparation of too many detailed designs; and
- Assumption that adequate funding was available.

Public requests for projects were commonly authorized, with no detailed evaluation of the project in relation to the total highway system or the availability of funds. The McKinsey Report cited, as further examples, large and costly highway designs where (in the study team's opinion) simpler designs might have been adequate.

Confronted with limited funding and rising costs, a new approach to highway planning was recommended: the development of a balanced statewide system that would result in maximum benefits for a given level of funding. This was accomplished by providing for the transfer of general state revenues to the State Highway Fund (SFD) to supplement dedicated-tax revenues so that a guaranteed level of funding could be attained. The amount of general revenue to be transferred each year was determined by the following formula:

General revenue transfer = (base amount x HCI) - dedicated revenue.

The implication was that Texas should build a practical highway system for near-term needs rather than an ideal one for the needs of the distant future--system benefits, rather than individual project benefits, should be maximized. Once a funding level was established for the entire state, the projects submitted by the districts would be selected by the SDHPT on the basis of how much they would contribute to the overall statewide system.

THE HCI

The HCI was designed to maintain the 1979 level of highway services ($750 million) by measuring and compensating for the impact of inflation on the costs of construction, maintenance, and operations--the three functional areas of highway activity. This was accomplished by comparing the combined weighted-average costs of construction, maintenance, and operations in the current fiscal year to what they were in the 1979 base year.

The SDHPT established a detailed record-keeping system for identifying relevant costs whereby the major expenditure activities of each functional area could be divided sequentially into increasingly disaggregated classes of expenditure denoted as categories, elements, and control items. For example, the functional area of maintenance contains categories of expenditures for maintenance materials, contracts and lease services, fuels, and highway equipment. These categories would be subdivided into 13 elements and 24 control items. The Texas Highway Cost Index Procedures manual defines the cost index for each step as "the summation of the products obtained by multiplying each of its respective cost indices by their corresponding usage factors or weights."

PROBLEMS WITH THE HCI

In the determination of the total state revenues for the SDHPT, the HCI and state-dedicated revenues must be forecast. Then, at the beginning of the fiscal year, the total dedicated revenues of the SDHPT must be set by multiplying the forecast HCI by $750 million. These dedicated revenues have two components: forecasted dedicated revenues, and a general revenue transfer equal to total dedicated revenues ($750 million times the forecasted HCI) minus forecasted dedicated revenues.

At the end of the fiscal year, when actual values for the HCI and dedicated revenues are known, corrections must be made. Revenues for SDHPT are corrected by determining the difference between what revenues should have been (the true HCI times $750 million) and the dedicated revenues (the forecast HCI times $750 million). Thus an underforecast of the HCI leads to additional revenues at the end of the fiscal year and an overforecast leads to the loss of revenues. (More precisely, any correction is added to or subtracted from the following year's certified revenues.) At the same time, the actual amounts of the dedicated revenues become known, and a correction in general revenue transfers is made. Therefore, errors in forecasting create two distinct problems: (a) a planning problem for the SDHPT, because incorrect forecasts of the HCI generate incorrect revenues that must be corrected later, and (b) the incorrect transfer of general revenue funds, which, under some conditions, may affect other state programs.

The forecasting of the HCI and general revenues became a problem because of serious errors in forecasting in the years following the adoption of the HCI. Table 1 gives information on various forecasts of the HCI, when they were made, and how they compare with the actual HCI for each fiscal year since the HCI forecasting procedure went into effect. (During fiscal years 1978 and 1979, the first years under House Bill 3, the HCI was assumed to equal 100.0.)

The data in Table 1 indicate that the HCI forecasts for 1981, 1982, and 1983 were consistently high and off by large amounts. Adjustments caused by these overestimates resulted in significantly reduced revenues in succeeding fiscal years. The effects of these overforecasts are even more significant considering that $7.5 million is associated with one point of error in the forecasts. In fiscal

TABLE 1 Forecast and Actual Values of the HCI

Fiscal Year	Date of Forecast	Forecast HCI	Actual HCI
1980	-[a]	109.16	122.64
1981	-[a]	118.16	113.80
1982	1980	151.43	120.15
1983	1980	162.97	120.15
1984	1982	143.51	127.85[b]
1985	1982	155.32	138.72[b]

[a] These two "forecasts," made in 1979, were determined by available general funds and not by a forecasting technique. The regular forecasts would have required more general funds than were available.
[b] Represents forecasts made in April 1984.

years 1982 and 1983, the overforecasts amounted to $234.6 million and $319.8 million, respectively, and $117.4 million and $169.5 million for 1984 and 1985, respectively. Because of the correction mechanism in the House Bill 3 formula, any overforecasts of the HCI would lead to revenues being taken back at the end of the fiscal year. Thus, these overestimates make it extremely difficult for financial planning.

When the HCI is broken down into its three major components, it becomes clear that the major error in forecasting the HCI comes from the construction component. The basic reason underlying this is the difficulty in forecasting energy prices. Energy prices are most important to construction costs and least important to operation costs (which are largely personnel costs), and are somewhere in between for maintenance. The large overforecasts of construction expenditures can therefore be explained partly by the fact that, although most forecasters in the early 1980s thought energy prices were going to increase steadily, energy prices actually stabilized in the early 1980s.

Also, beginning in 1981, increased competition from construction apparently drove down bids submitted for construction projects, a phenomenon that was not foreseen and not included in HCI forecasts. Because the construction component of the HCI is based on bids submitted by contractors, it is an important variable in the forecasting procedures.

In addition to forecasting difficulties, the HCI also had a theoretical flaw in its construction. The HCI was designed to measure price inflation associated with the cost of individual inputs for providing highway services rather than price inflation associated with the cost of producing outputs for highway services. The latter should cause significant concern. However, this problem would not be significant if, from one year to another, similar types of projects (e.g., the construction of a new mile of road on the Interstate system or the rehabilitation of a mile of road on the state system) required the same ratio of input to outputs (e.g., the exact same amount and kind of machinery, man-hours, cubic yards of earth removal, etc.). When the ratio of inputs to outputs changes, so does the productivity from providing highway services. As productivity increases, the cost per unit of output might well decrease, even in the face of rising prices for inputs. The difficulties of creating reliable measures of outputs of highway services are well known; yet, some effort should have been made to establish one or more output indices, whatever their weaknesses, to determine changes in productivity and to gauge the real impact of price inflation on the provision of highway services.

CONCLUSIONS

After 6 years of operation, the Texas legislature in its first 1984 special session voted to discontinue the use of the HCI procedure. In place of the general revenue transfer, fuel taxes were increased to 10 cents per gallon and motor vehicle registration fees were also increased. The HCI mechanism did not provide the desired stability for highway funding. Unpredictable energy prices as well as a mix of other factors created considerable concern over the basic utility of the index. Although the index itself did not succeed, it served as a catalyst for major discussions on highway finance.

During the past decade, the SDHPT has performed a number of planning studies that have affected their programming operations. These studies are seen to be evolving toward a rational cost-benefit concept of balancing mobility and preservation requirements with financial constraints. Priority or preference assignment predicated upon such a concept can be a means of ensuring goal attainment, effective management, and accountability.

Publication of this paper sponsored by Committee on Taxation, Finance and Pricing.